



Whitepaper

Cloud Managed IT for Modern Organizations

DECEMBER 2016

This whitepaper discusses modern IT trends and explores how the Cisco Meraki portfolio of IT solutions work together to deliver a comprehensive, reliable, end-to-end IT solution for modern organizations

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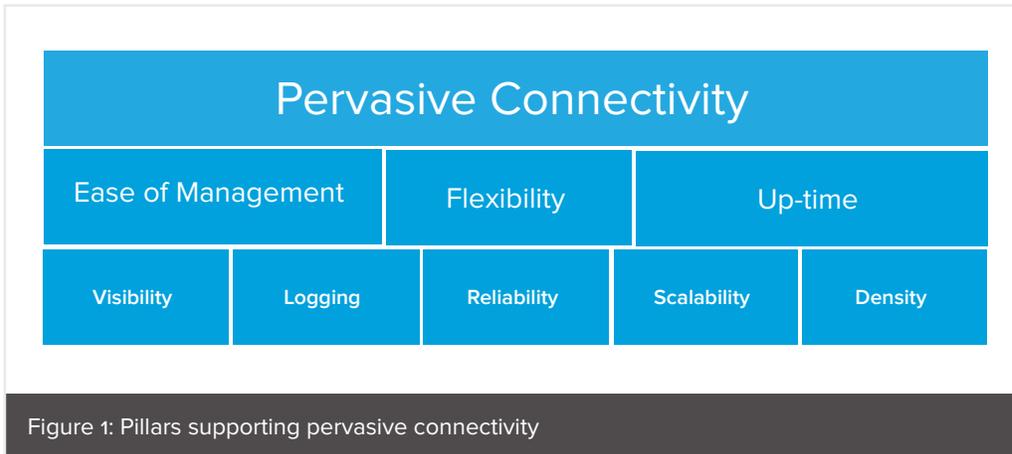
Introduction

Modern networks are vast and complex, spanning the globe to make information available to everyone within an organization and have begun to encompass new areas of technology. The Internet has unlocked tremendous new capabilities and technologies, but these innovations require persistent and reliable network connectivity. Salesforce's® Customer Relationship Management (CRM) cloud product for example is now widely used by businesses for its significantly lower cost and overhead when compared to on-premise predecessors. The cloud is driving an insatiable demand for faster, more reliable network access, and for IT organizations the pressure is on.

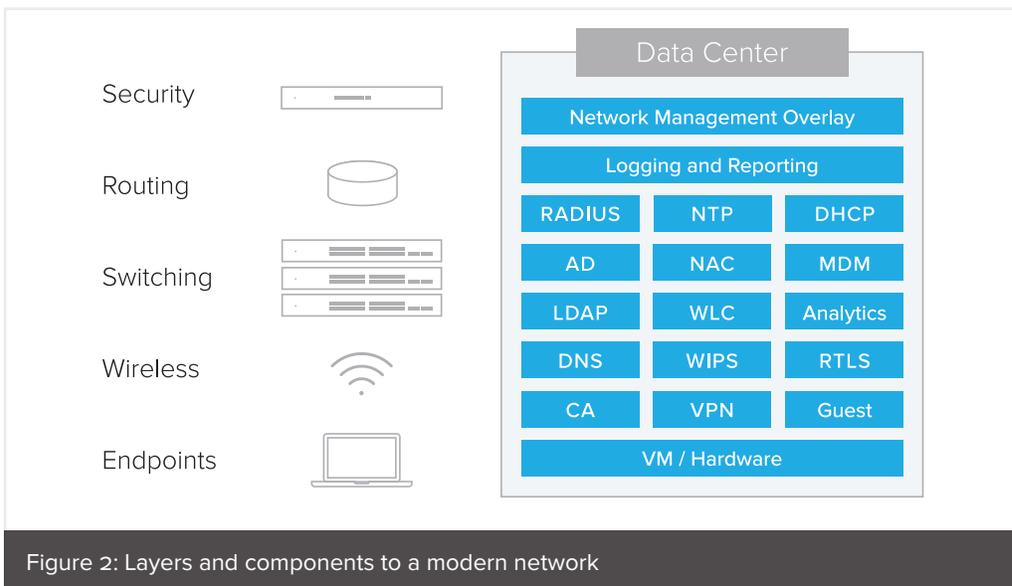
Cisco Meraki offers a comprehensive portfolio of cloud-managed IT solutions designed to work together to help deliver a modern network that is powerful, reliable, and easy to manage. An active internet connection and a browser is everything you need in order to manage Meraki products from anywhere, even from a mobile device. This unique approach to IT is not offered by any other vendor and aims to simplify powerful technology by reducing the overhead and costs associated with maintaining disparate solutions.

Pervasive Connectivity

At the center of any network are the users and devices that rely on it. In a modern organization, users expect to be online at all times; site-to-site connections must be fast and reliable, wireless connectivity is no longer best-effort, and internet access is critical to the business. Even the smallest outage can cause a devastating blow to productivity and company image. IT organizations are therefore focused on delivering consistent, reliable, pervasive connectivity to users, as in being connected to the necessary resources and services no matter whether in the office, with a client, or on the road. From an IT perspective, there are many factors involved in delivering pervasive connectivity, and selecting the proper solution is fundamental.



Most networking solutions are designed with a focus on feature breadth and hardware capabilities. Not enough emphasis is placed on improving an organization’s ability to scale out the network while still being able to manage, monitor and maintain the many services needed to keep a modern network performing. Services supporting user access, network and physical security, performance and productivity must all work together but often and counterintuitively make the network far more difficult to manage. IT organizations are left to set up, integrate, and host this variety of complex, multi-vendor solutions that when tied together are able to address the many elements that drive reliable and pervasive connectivity.



Advantages of Cloud Managed IT

Meraki offers an extensive portfolio of IT products designed for the modern enterprise. These products include wireless access points, security appliances, access and distribution switching, VoIP phones, mobility management, and video surveillance and are each built to work together to help deliver a truly scalable and easy to manage comprehensive IT solution.

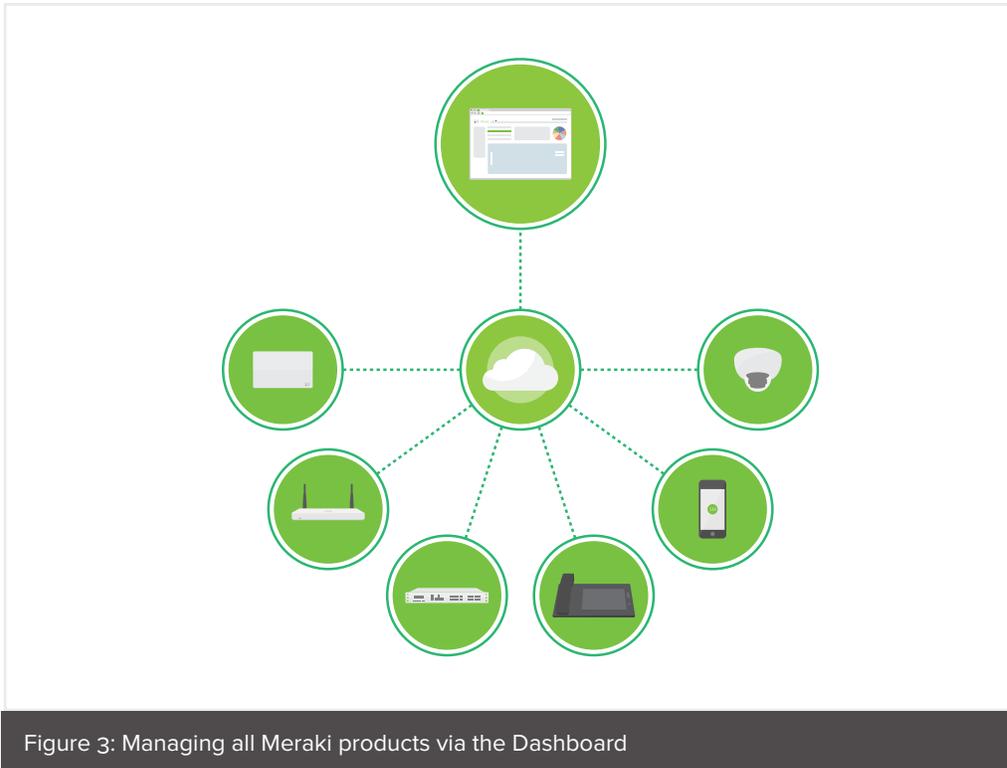


Figure 3: Managing all Meraki products via the Dashboard

This ecosystem of products offers a completely new and refreshing approach to IT. All of Meraki's products have been designed to have a consistent and seamless user experience, whether setting up a new switch, configuring a group of wireless access points, or assigning a phone number to an employee's IP phone. This begins with eliminating the cost and complexity of wireless controllers, logging servers, onsite telephone systems, or overlay network management solutions. Integrated with Meraki's entire product portfolio, cloud management via the Meraki Dashboard, a browser-based user interface, adds feature-rich, elastic, and intuitive centralized management for networks of any size. This architecture aims to reduce costs and simplify the way customers interact with the network by adding powerful tools and new insights into user behavior, traffic patterns, and network events. In addition to these core advantages, the Meraki solution also provides all of the components needed to deliver pervasive connectivity to an organization by offloading many of the supporting services to the Meraki cloud. Let us explore these advantages in further detail.

SIMPLIFYING NETWORK MANAGEMENT

IT products typically require three stages of interaction - initial deployment, device management, and maintenance. It is worth highlighting the uniqueness of these stages as it applies to the Meraki solution:

| Stage | Process | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--------------|-------|---------------|--|--|--------|------|--------------|-------|---------------|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|
| <p>Initial Configuration & Deployment</p> | <p>With Meraki cloud management, products are easily added to the Dashboard and can be immediately provisioned without unboxing the hardware, allowing IT to benefit from a zero-touch deployment model. The process of setting up any Meraki product is nearly identical, making it simple, easy to repeat, and highly elastic as network requirements grow.</p> <p>Once powered and connected, all Meraki products will automatically search for an internet path, check for any available software updates, and fetch any configuration that was staged. This is a tremendously powerful benefit, particularly in large or highly distributed networks.</p> <div data-bbox="711 789 1081 953" data-label="Diagram"> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Management</p> | <p>Meraki's Dashboard makes it extremely easy to verify that all network devices are connected, have the latest software, and are up-to-date.</p> <div data-bbox="727 1104 1068 1289" data-label="Table"> <table border="1"> <thead> <tr> <th colspan="5">SWITCHES</th> </tr> <tr> <th>STATUS</th> <th>NAME</th> <th>CONNECTIVITY</th> <th>IMAGE</th> <th>SERIAL NUMBER</th> </tr> </thead> <tbody> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> <tr><td>●</td><td>---</td><td>---</td><td>---</td><td>---</td></tr> </tbody> </table> </div> <p>The Dashboard provides detailed insight into the health and performance of the network through a variety of unique features, tools, and proactive alerting. The Dashboard is multi-tenant and highly flexible, allowing teams to collaborate and work together to solve a problem.</p> | SWITCHES | | | | | STATUS | NAME | CONNECTIVITY | IMAGE | SERIAL NUMBER | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- | ● | --- | --- | --- | --- |
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| <p>Support & Maintenance</p> | <p>Logging, alerting, and debugging tools are all built directly into each product, and are easily accessible via the Dashboard, or a variety of other services. Get notified by the Meraki cloud if a device loses connectivity, or easily find troublemakers on the network with our automated network summary reports which highlight network anomalies before impacting users. Software updates for all products are fully managed by the Meraki cloud, requiring only a user defined maintenance window. If help is ever needed, Meraki support is reachable from directly within the Dashboard, cutting down on the time it takes to reach a resolution.</p> <div data-bbox="617 1759 1179 1927" data-label="Diagram"> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

As demonstrated above, Meraki offers a network-as-a-service (NaaS) management solution as part of the products and architecture. While each product can function independently, the more Meraki products deployed, the more intelligent the network becomes. When connecting a Meraki access point or phone to a Meraki switch for example, the devices recognize each other and instantly expand the available tools, capabilities and visibility an administrator has access to. When a new product is added to the Dashboard, a new tab simply appears in the menu, unlocking new capabilities and services. Administrators can build on this basic principle to manage and configure the entire organization from edge to core, without ever leaving the Dashboard.

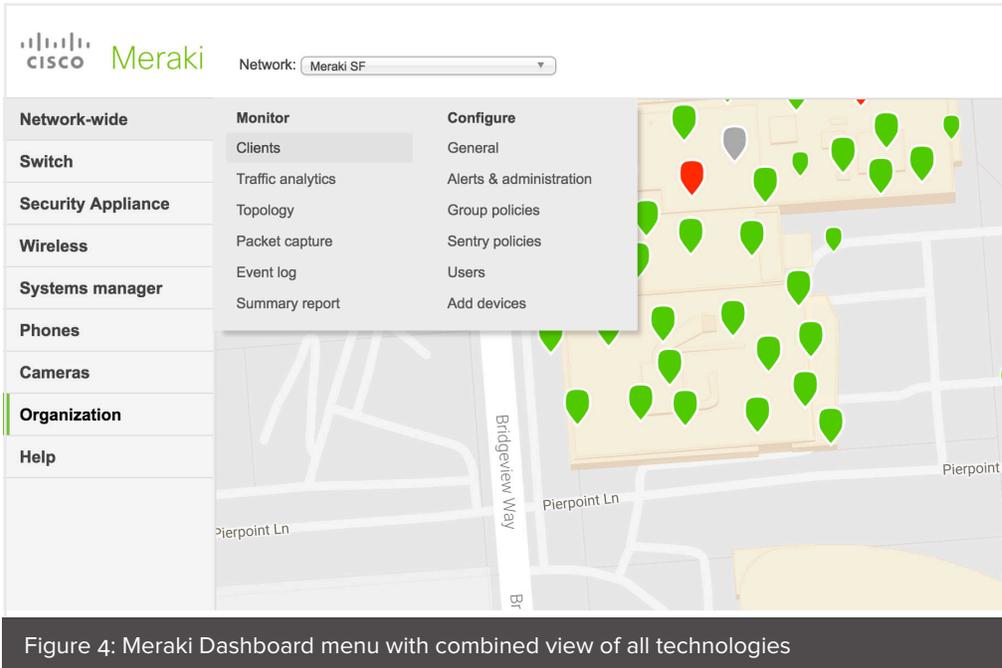
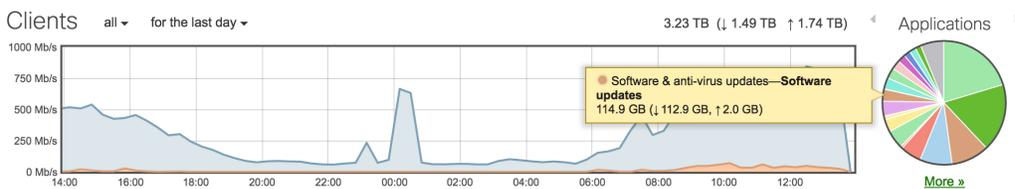


Figure 4: Meraki Dashboard menu with combined view of all technologies

END-TO-END VISIBILITY

As businesses grow and evolve, IT teams are faced with new challenges as they work to accommodate more users, new locations and technology demands while maintaining performance and keeping costs down. Visibility and insight into the health of the services being delivered can be crucial in helping organizations navigate these challenges and can also be important in making technology decisions.

Visibility is one of the cornerstones of Meraki technology. Using powerful cloud computing, we are able to highlight network trends and anomalies instantly, providing new insight into exactly how the network is being used, and where trouble might be lurking. For example, the ability to search or find any individual client device that has recently connected to the network, along with where and when they arrived, can be crucial information for both monitoring network performance and for troubleshooting. Meraki makes this possible for wired and wireless clients, in a single pane of glass for the entire organization. Beyond individual clients, macro trends are also accessible, such as the applications and bandwidth consumed for the entire network.



Visibility with Meraki goes far deeper than most solutions, allowing users to view exactly where a client is currently connected, whether to an access point, switch, security appliance or even spanning outside the corporate network with Systems Manager. Organizations can also view how the network components themselves are interconnected. The network topology view automatically maps network architectures, showing how Meraki security, switching, wireless, communication and video surveillance devices are connected. This is available without any additional software or licenses, and can save businesses significant time when troubleshooting or performing a network inventory. With multiple Meraki products installed, administrators can trace the path a specific user takes through the complete network; Take for example this simple search for a user named “Joe Phillips”:

Policy ▾ Joe Phillips ▾ 1 match in 2143 Add client ▾ Download as ▾

| <input type="checkbox"/> | Status | Description | Connected to | Last seen | Usage ▾ | OS | IPv4 address | Policy | + |
|--------------------------|--------|----------------------------------|-----------------------------|--------------|----------|----------|---------------|--------|---|
| <input type="checkbox"/> | 1 | joe-phillips-mbp | E6.5 0C53 B | Sep 13 14:09 | 835.5 MB | Mac OS X | 10.92.134.193 | normal | |

Entering just this username yields an exact match out of 2,143 currently connected clients, and the status for this client indicates this user is successfully connected to the wireless network. The “Connected to” column also links directly to the Meraki access point this user is connected to.

END-TO-END VISIBILITY, CONTINUED

By selecting the access point, the Dashboard displays the monitor view for the access point along with detailed LAN information about how the device is connected. Since the access point is connected to a Meraki switch, a direct link to the Meraki switch and port is also available:

| | | |
|------------|---|---|
| LAN IP | 10.92.129.55 (via DHCP) |  |
| Public IP | 184.23.135.130 | |
| Gateway | 10.92.129.254 | |
| DNS | 10.92.129.117 10.92.131.26 | |
| Ethernet 1 | 1000 Mbit, full duplex | |
| | ● Closet 4.1.13 / Port 30 | |

From here, users can continue to follow the logical path this network client takes, all the way from the edge to the core of the network. If at any point there is a network problem, an easy to understand alert will be displayed, helping to quickly identify and remedy connectivity issues. This is just one example of the extremely powerful and extensive visibility the Meraki Dashboard adds to the entire portfolio.

STREAMLINING CONFIGURATION AND ELIMINATING ERRORS

Increasing demand for secure and high performing network services tends to also introduce complexity. Quality of service, network access control, redundancy and warm sparing, device roaming and advanced call routing are features most administrators are intimately familiar with. These are also complex to configure, and therefore the margin for error is high. One misstep, and an important teleconference meeting can end in disaster.

With a Meraki network, configuring even the most advanced features becomes straightforward. This is made possible by leveraging the cloud to help construct and issue advanced configurations to all network elements simultaneously, from the access points and switches to the network gateway. Using network access control (NAC) as an example -- Dashboard lets organizations define group policies capable of spanning the complete Meraki network, following the linked user or device wherever it may roam within the network. A group policy can define which applications and services a particular user or group are permitted to access, and can be automatically applied to different users or devices within an organization. Below is an example of a group policy that is being dynamically applied to an organization's accounting employees. It is configured to place them onto a separate VLAN, allow them to bypass security screening, and it also throttles their bandwidth consumption to a maximum of 500 Kb/s:

[Accounting](#) [46 clients](#) 500.00 Kb/s up, down VLAN 108 Bypass Default 2 rules applied

This policy will apply no matter where in the Meraki network the users connect. Behind the scenes, when a new group policy such as this is configured, the Meraki cloud will distribute this policy to all Meraki elements across network, automatically, guaranteeing a persistent experience for each user. Many other capabilities of the Meraki solution follow similar logic, thus cutting down on repetitive configuration, and significantly reducing the potential for error.

ENHANCED SECURITY

In addition to deep network visibility, Meraki products also support powerful security capabilities built in and designed to integrate seamlessly. A great example is network authentication via System Manager Sentry, a technology that uses Meraki Systems Manager, Cisco’s Enterprise Mobility Management (EMM) solution, to easily and securely authenticate users across the entire network. This works by offloading all of the complexity normally involved in configuring WPA2 Enterprise authentication to the Meraki cloud. Any device connecting to the network will be verified via the Systems Manager software, which acts as an authenticator, and only those permitted will be allowed on the network. This example demonstrates how a typically complex security setup can be very easily and rapidly accomplished by leveraging multiple Meraki products and the cloud.

IMPROVED NETWORK RELIABILITY

Managing enterprise networks has long remained fairly unchanged. Over the years, many organizations have resorted to building their own monitoring solutions, custom scripts, and troubleshooting systems in order to remain efficient and proactive.

The reporting, alerting and logging capabilities of any enterprise network are critical as they are the first line of defense and can inform IT when something’s amiss. It can take significant time to properly configure these services, and can require additional dedicated infrastructure. If not properly set up, these services can be extremely error prone.

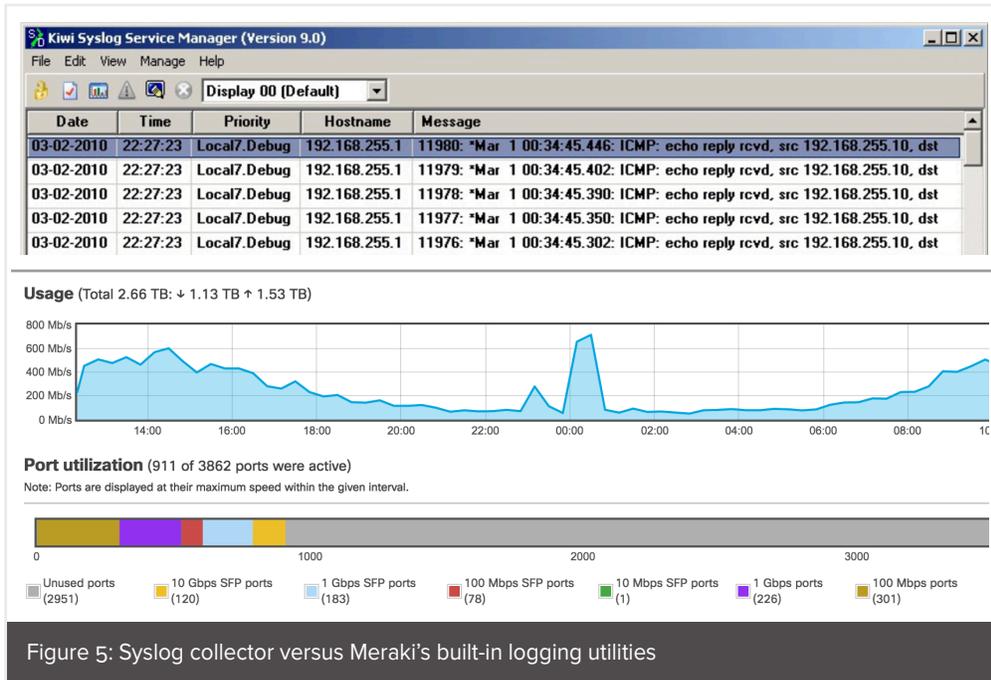
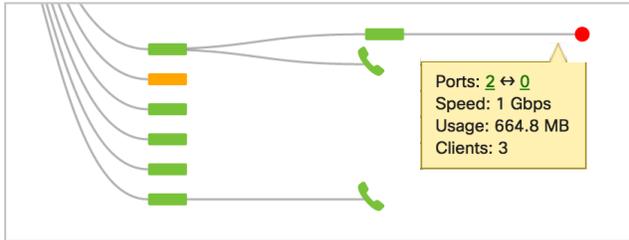


Figure 5: Syslog collector versus Meraki’s built-in logging utilities

All Meraki products include an expansive set of monitoring and logging tools, built directly into the Dashboard. Meraki products double as distributed monitoring nodes, providing valuable information about how the entire network is performing in real-time. As with the other benefits already discussed, administrators do not need to access any other systems to get to this information as it is all available directly within the Dashboard, making it easy to analyze historical or real-time network events that tie directly back to a specific network device or client.

TROUBLESHOOTING WITH THE FULL STACK

If a Meraki device loses connectivity or local Internet service is disrupted, an alert will immediately inform administrators that something's amiss. It is then possible to respond from anywhere with an internet connection, or by using each device's local status page, if necessary.



For example, if an access point or phone loses connectivity, the entire IT team can opt to receive push notifications from the Meraki cloud. Combining these alerts with built-in intuitive logging and easy-to-use diagnostic tools makes it refreshingly simple to uncover and remedy the root cause from anywhere, even from a mobile device.

With a complete Meraki network, troubleshooting capabilities strengthen. From the MR access point or MC phone status page, the network administrator can quickly identify and view the switch and port the device is connected to.

● Serpentine ✎

MC74 e0:55:3d:4e:b0:4e

Unreachable for 1 day

Ethernet 1 1000 Mbit, full duplex

● [Closet 4.2.2 / Port 36](#)

From here it is easy to determine whether the link is active, helping quickly identify where the problem exists. If a cable problem is suspected, administrators can select the “cable test” tool on the selected switch port and the switch will perform diagnostics on the ethernet cable and identify whether a physical problem exists. Once a problem is uncovered, all the information is presented in a clear, easy to understand report that can be shared with the rest of the team.

Run a cable test on this port ▶

Warning: a cable test will disrupt traffic to 100 or 10 Mbit devices.

| Port ^ | Link speed | Length (± 3m) | Status | Pair 1 | Pair 2 | Pair 3 | Pair 4 |
|--------|------------|---------------|---------|--------|--------|--------|--------|
| 17 | 1Gfdx | 52.5 m | Failure | ok | ok | ok | shortB |

Technology that Simply Works

As organizations adopt new technologies to increase productivity and reduce costs, pervasive connectivity will be fundamental in helping employees stay focused on the organization's mission. Whether updating an existing network or expanding into new offices and countries, consider the many benefits that Meraki's complete portfolio of networking and IT products can add. We make it easy to try any of our products, and stand behind our own mission - we believe that by simplifying powerful technology, we can free passionate people to focus on their mission.



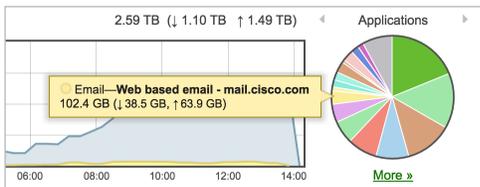
ENHANCED SECURITY

Imagine a world where you can see all the devices that have connected to your network, how each of them are connecting, and which applications are being used. Meraki makes this possible, and it is an extremely powerful new way to explore and use the network.

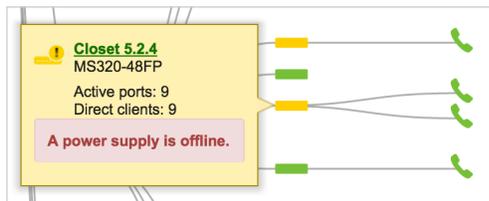
Policy ▾ printer ▾ **14 matches**

| <input type="checkbox"/> | Status | Description ▾ | VLAN |
|--------------------------|--------|----------------------|------|
| <input type="checkbox"/> | 🟢 | Printer-WHITE-KNIGHT | 110 |
| <input type="checkbox"/> | 🟢 | Printer-Ratatoskr | 110 |
| <input type="checkbox"/> | 🟢 | Printer-Platypus | 110 |
| <input type="checkbox"/> | 🟢 | Printer-Phoenix | 110 |

The **client view** provides a comprehensive list of all connected client devices. The contextual search lets you enter in a user name or IP address and immediately find a specific device. See exactly how each device is connecting in real-time and even apply a dynamic user policy that follows the device and gets applied no matter where that device travels within the network.



Built-in **application visibility** lets you see top applications for a specific user, or for the entire network. This provides IT with a new and refreshing way to see how devices are making use of network services and applications



Network topology automatically maps network architectures, showing how Meraki security, switching, wireless, and communication devices are connected—including redundant links disabled by the Spanning Tree Protocol to prevent data loops.



Cloud alerting and Logging capabilities are intuitive to respond to and help identify problems before they affect your organization. All events are stored and searchable, without any added network components